



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,036	09/18/2006	Teruo Amoh	20239/0204318-US0	3301
7278	7590	07/23/2009		
DARBY & DARBY P.C. P.O. BOX 770 Church Street Station New York, NY 10008-0770			EXAMINER BELOUSOV, ALEXANDER	
			ART UNIT 2894	PAPER NUMBER
			MAIL DATE 07/23/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/599,036

Applicant(s)

AMOH ET AL.

Examiner

ALEXANDER BELOUSOV

Art Unit

2894

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4 and 6-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4 and 6-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 05/18/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to the amendment filed on 05/18/2009. Currently, claims 1, 3, 4 & 6-13 have been examined. All the references in this rejection are the ones that the Applicant is aware of (the references came from the IDS), hence, no "Notice of Reference Cited" is included with this Action.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 05/18/2009 was filed after the mailing date of the Office Action on 12/31/2008. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 3, 4 & 7-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over (JP-2002-127948) by Ishii et al ("Ishii"; please use US-2005/0167679 as the *official translation* of the Japanese reference; *all* the references in the rejection are to the *US version* of the reference).

Regarding claim 1, Ishii discloses in FIG. 1 and related text, e.g., a semiconductor light-emitting element mounting member (3) comprising:

a substrate (4); and

a metal film (6, 7a & 7b) formed on a surface of said substrate (it is above substrate's surface; hence, "on"), formed from Ag, Al, or an alloy containing said metals (paragraph 60: "mainly of Au"; hence, an alloy of mostly Au), and functioning as an electrode layer (paragraph 6) for mounting *at least one of* a semiconductor light-emitting element (2; it is above it; hence, "for mounting", etc) and a reflective layer for reflecting light from a semiconductor light-emitting element wherein;

the thickness of the metal film is 0.5-3 micron (paragraph 64 specifies the range of layer thicknesses for layers 6, 7a & 7b; it meets the requirement of "0.5-3" by an overlapping range); an adhesion layer (5b) and a barrier layer (5a) are formed, in sequence, on said substrate, with said metal film being formed on said barrier layer;

the thickness of the adhesion layer is 0.01-1.00 μm (paragraph 64); and
the thickness of the barrier layer is 0.01-1.50 μm (paragraph 64);

Ishii does not **explicitly state** crystal grains of *said metal or alloy* forming said metal film have a particle diameter along a surface plane of *said metal film* is no more than 0.5 micron and said surface of *said metal film* has a center-line average roughness Ra of no more than 0.1 micron.

Ishii discloses in FIG. 1 and related text, e.g., crystal grains of *said substrate* forming said *substrate* have a particle diameter along a surface plane of *said substrate* is no more than 0.5 micron and said surface of *said substrate* has a center-line average roughness Ra of no more than 0.1 micron (paragraph 58 specifies the particle diameter and average roughness of the substrate; if the substrate is crystalline, then the above specifications inherently apply to the

crystal grains of the substrate, because otherwise the substrate would not meet them; paragraph 58 also states that this was a known Japanese **industrial standard**).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Ishii with crystal grains of *said metal or alloy* forming said metal film have a particle diameter along a surface plane of *said metal film* is no more than 0.5 micron and said surface of *said metal film* has a center-line average roughness Ra of no more than 0.1 micron, in order to make sure that no gaps develop between the chip mounted on the submount and the submount (paragraph 58; if such a standard exists for the substrate, in order to avoid gaps between the chip and submount, then it would be common sense to extend such a standard to other layers that are present in the submount, for the same reason).

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Ishii with “crystal grains of *said metal or alloy* forming said metal film have a particle diameter along a surface plane of *said metal film* is no more than 0.5 micron and said surface of *said metal film* has a center-line average roughness Ra of no more than 0.1 micron”, since substitution of one known element (specification for the surface roughness and particle diameter) for another known equivalent element (a default surface roughness and particle diameter) resulting in the predictable result (improved reliability of the device, due to reduced chance of gaps appearing) is considered obvious to one of ordinary skill in the art.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Ishii with “crystal grains of *said metal or alloy* forming said metal film have a particle diameter along a surface plane of *said metal film* is no more than

0.5 micron and said surface of *said metal film* has a center-line average roughness Ra of no more than 0.1 micron”, since use of known technique (strict standard on surface roughness and diameter) to improve similar devices in the same way (applying the standard to more layers) is considered obvious to one of ordinary skill in the art.

Regarding claims 3 & 4, Ishii discloses in FIG. 1 and related text, e.g., said metal film is formed as an alloy of at least one of Ag and Al and other metal, a proportional content of said other metal being 0.001-10 percent by weight (paragraph 64 specifies the range of layer thicknesses for layers 6, 7a & 7b; the ranges of the layer thicknesses are sufficiently broad to allow it to meet the requirement of “said other metal being 0.001-10 percent by weight” by an overlapping range; for example, by making 7b out of Cr, and making it sufficiently thin when compared to layer 6; also, layer 6 is “mainly Au”, which means that it is an alloy; also alloying inherently occurs when different metal layers are stacked on each other: due to heating and compression, there is an intermingling at the boundaries between the layers) , wherein said other metal is at least one type of metal selected from a group consisting of Cu, Mg, Si, Mn, Ti, and Cr (see paragraph 59; the layer 7b can be Cr).

Regarding claims 7 & 8, Ishii discloses in FIG. 1 and related text, e.g., a thermal expansion coefficient of said substrate (4) is 1.times.10.sup.-6/K-10.times.10.sup.-6/K and a thermal conductivity of said substrate is at least 80 W/mK (paragraph 4; “AIN”; by Applicant’s admission on page 12, lines 11-12, “AIN” meets the above claim limitations).

Regarding claim 9, Ishii discloses in FIG. 1 and related text, e.g., wherein said semiconductor light-emitting element mounting member is a flat submount (it has a flat surface).

Regarding claim 10, Ishii discloses in FIG. 1 and related text, e.g., a semiconductor light-emitting element (2) mounted in said semiconductor light-emitting element mounting member.

Regarding claim 11, Ishii discloses in FIG. 1 and related text substantially the entire claimed structure, as recited in claims 1 & 10, but does not explicitly state the output of said semiconductor light-emitting element is at least 1 W.

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the device of Ishii with the output of said semiconductor light-emitting element is at least 1 W, in order to be able to use the element mounting member in an application requiring high-power light-emitting elements.

Regarding claims 12 & 13, Ishii discloses in FIG. 1 and related text, e.g., said substrate is an insulative ceramic that is selected from a group consisting of AlN, Al₂O₃, SiC, Si₃N₄, BeO, BN, and insulative Si (paragraph 4).

5. **Claim(s) 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over (JP-2002-127948) by Ishii et al ("Ishii"; please use US-2005/0167679 as the *official translation* of the Japanese reference; *all* the references in the rejection are to the *US version* of the reference) as applied to claim(s) 1 above, and further in view of (US-2002/0171087) by Krames et al ("Krames").

Regarding claim 6, Ishii discloses in FIG. 1 and related text substantially the entire claimed structure, as recited in claim 1, except wherein said metal film is formed from Al alone or from an alloy of Al and other metal.

Krames discloses in FIG. 10(b) and related text, e.g., wherein said metal film is formed from Al alone or from an alloy of Al and other metal (paragraph 52, "Metallization 52, e.g. Ag or Al"; also, see paragraph 61, "Ag and Al are suitable choices for the submount top surface metallization")

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Ishii with wherein said metal film is formed from Al alone or from an alloy of Al and other metal, in order to improve the marketability of the device in a price sensitive segments of the market by reducing the cost of materials (as is known to everyone, Aluminum is quite a bit cheaper than Gold).

Response to Arguments

1. Applicant's arguments with respect to above claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Belousov whose telephone number is 571-270-3209. The examiner can normally be reached on Monday - Thursday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Nguyen can be reached on 571-272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Belousov/
Examiner, Art Unit 2894
07/11/2009

/Bradley K Smith/
Primary Examiner, Art Unit 2894